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Engagement in Classroom Learning: Creating Temporal Participation Incentives for Extrinsically Motivated Students Through Bonus Credits

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Extrinsic inducements to adjust students' learning motivations have evolved within 2 opposing paradigms. Cognitive evaluation theories claim that controlling factors embedded in extrinsic rewards dissipate intrinsic aspirations. Behavioral theorists contend that if engagement is voluntary, extrinsic reinforcements enhance learning without ill effects. The author offers a simple engagement bonus awarding strategy highly adaptable to learners. The model is an application of the labor supply theory and is an extension of the impact of premium wages on incentives to work overtime. Empirical results support the hypothesis that incentives to engage substantially increase as bonus scores increase the opportunity costs of leisure.

Keywords: bonus, engagement, extrinsic rewards, intrinsic motivations

Intrinsically motivated behavior was defined by Deci (1975) as an activity whose initial impulse originates from self-motivation. Intrinsically motivated behavior is valued for its own significance, not for a reward. In an academic setting, then, an intrinsically motivated student studies a topic primarily for the strong desire to learn specific subject matter and satisfy his or her natural curiosity. In contrast, learning to acquire rewards other than for the inherent interest in learning are extrinsically motivated and are judged as outcomes separable from the learning itself (Vansteenkiste, Willy, & Deci, 2006). For example, students who study to satisfy a curricular requirement are viewed as being extrinsically motivated.

Since the early 1970s, cognitive evaluation theorists have promoted an uncompromising proposition that deep and lifelong learning effectively takes place only if the learning process is not mediated by external rewards (Deci, 1971). The contention was that extrinsic rewards may become a substitute target and distract the learner from achieving the goal of learning (Deci, Koestner, & Ryan, 1999; Luyten & Lens, 1981; Vansteenkiste et al., 2004).

Another line of reasoning against the use of extrinsic rewards was articulated within the structure of self-determination theory (SDT). SDT identifies autonomy as one of the basic human needs toward positive psychological development (Deci & Ryan, 2000). According to Patrick, Canevello, Knee, and Lonsbary (2007), to feel volitional is an antecedent to a sense of fulfillment and optimal human functioning. Within SDT, the absence of autonomous decision making results in individuals feeling similar to pawns (deCharms, 1968) separated from the process, remaining alienated and disconnected from the outcomes (Deci & Ryan). The same line of reasoning argued that extrinsic rewards, often used as a medium of controlling learners' behavior, undermine self-determination, diminish interest, and subside natural curiosity, which in turn weakens learners' sense of relatedness and competence (Vansteenkiste et al., 2006).

Indeed this line of argument challenged and negated 40 years of standard practice and successful use of extrinsic rewards in classrooms (Slavin, 1997). A myriad of articles generated ample evidence in favor and against the harmful effects of extrinsic rewards on intrinsic motivations. Inevitably, the literature went through an evolutionary dialogue. Only after three seminal meta-analysis studies by Cameron and Pierce (1994), Deci et al. (1999), and Cameron, Banko, and Pierce (2001) did researchers finally arrive at some consensus. The new understanding of motivational role of extrinsic rewards is delineated by Vansteenkiste et al.'s (2006) structure of SDT.

It appears that SDT theorists and social cognitive researchers have at last agreed that students' intrinsic

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interest for learning does not have to be innate. They concur that under proper provision, extrinsic rewards may in effect ignite intrinsic motivation and therefore reinforce learners' participation and deep learning. Consequently, with the understanding that classroom engagement motivations are inherently changeable (Linnenbrink & Pintrich, 2002), researchers have begun making a variety of propositions in the classroom instructional design to align extrinsic rewards with intrinsic motivations.

These propositions are made with the understanding that extrinsic and intrinsic motivation is a continuum representing a distribution of variations in individual learners' incentives to learning (Akin-Little, Eckert, Lovett, & Little, 2004). For example, a retiree who is reading just for the sake of satisfying an innate curiosity is located on one extreme of the continuum, and an employee who is learning only for the sake of a monetary raise is at the other end. Those in the middle have mixed motivations. For example, college students learn to gain knowledge and simultaneously advance toward acquiring a college degree for the sake of tangible future rewards. Meanwhile, the challenge is to reformulate extrinsic rewards to elevate intrinsic motivations among these students to a level sufficient for achieving educational goals such as lifelong learning and problem solving.

Among those propositions, three are relevant to this study. First, a clear distinction must be made between intrinsic goal framing and the use of extrinsic rewards. It is imperative that students interpret extrinsic rewards only as an instrument of support for achieving higher properly formulated intrinsic goals. The contention is that if intrinsic goals are framed properly, extrinsic rewards can be effectively used only as reinforcing tools to enhance learners' motivation for learning (Akin-Little et al., 2004; Cameron & Pierce, 1994).

Second, extrinsic rewards must be framed in a manner perceived as being autonomy-supportive as opposed to controlling (Allen, Hauser, Bell, & O'Connnor, 1994; Soenens & Vansteenkiste, 2005; Vansteenkiste et al., 2006). Within SDT, it is essential that learners do not feel coerced but rather supported with extrinsic rewards to achieve the goal of learning. This argument is based on the idea that "autonomy-supportive environments are associated with various benefits, including academic competence, school achievement, and higher well being" (Vansteenkiste et al., p. 21).

Finally, the third and most practical proposition is for teachers to create interest in classroom activities. The research on students' interest differentiates between personal and situational interest. Hidi and Harackiewicz (2000) defined personal interest as a reflection of a student's individual choice and preferences on a topic that may or may not last. In contrast, situational interest extends beyond readings and its effectiveness "is based entirely on the features of the learning context" (Linnenbrink & Pintrich, 2002, p. 319). It follows that creation of appropriate situational interest enhances students' meaningful participation in classroom activities with long-lasting results.

As a result, the teaching-learning literature in education, psychology, business, and other disciplines is deluged with prototypes of specific guidelines on how to create engaging strategies conducive to intrinsic motivations. Activities intended to motivate classroom engagement can take a number of configurations limited only by the creativity of the instructors. It is not within the scope of this article to review the various methods in the literature. All the suggested schemes have their own merits and are effective in their particular circumstance.

In this article I examine the efficiency of an experimental teaching method that is compatible with the three propositions mentioned previously. In this teaching method, classroom lectures are supplemented with in-class activities and with the granting of bonus scores for additional student undertakings with a teamwork setup.

First, students are directed to understand that the granting of a bonus is a reward closely associated with individual efforts to arrive at the team's ultimate goal of mastering the learning material. Second, student activities to acquire bonus scores are by definition voluntary. Therefore, participation is not coercive; rather it is optional, volitional, and only encouraged with extrinsic rewards. Finally, in an in-class teamwork situation, students are rewarded for spending time learning how to articulate and teach one another. As students communicate and share their thoughts, a deeper level of thinking takes place (Knabb, 2000), and students develop a collective "learning synergy that surpasses the sum of their individual efforts" (Mutch, 1998, p. 51) and benefits the learning of the team.

In a collaborative learning arrangement, the role of the instructor ranges from an observer to a facilitator. The instructor monitors students' interactions, directing and helping them to achieve teams' objectives. The effectiveness of collaborative learning and the contribution of variety of in-class teamwork techniques to students' success in learning is well documented and need not be repeated here (e.g., Bartlett, 1995; Cottell & Millis, 1993; Fiechtner & Davis, 1992; Hernandez, 2002; Michaelsen & Black, 1994; Michaelsen, Fink, & Knight, 1997; Persons, 1998; Rassuli & Manzer, 2005; Tanner & Lindquist, 1998).

The purpose of this article is to demonstrate the instrumental value of a bonus reward system in enhancing the temporal efficiency of classroom engagement to form intrinsic learning interest. Specifically, I test the hypothesis that inclusion of a bonus score reward scheme would increase the time and intensity students allocate to assigned in-class team projects. Incentives to participate can be altered simply by adapting a proper score reward system. This is accomplished through the application of the labor-supply principle of premium wages for overtime work, and adapted to students' in-class team activities. If assuming that leisure is a normal good and that students value instant rewards, then there will be no need at the outset to instill far-reaching intrinsic values to engage initially extrinsically oriented students.

TIME VALUE OF CLASSROOM ENGAGEMENT

The efficacy of classroom engagement to promote deep learning has long been recognized. The literature is rife with multifaceted methods to entice students to invest time and effort in learning (Howard, James, & Taylor, 2002; Weaver & Qi, 2005) as an "antidote to boredom and student alienation" (Fredricks, Blumenfeld, & Paris, 2004, p. 60). For example, Mutch (1998) and Bobbitt, Inks, Kemp, and Mayo (2000) emphasized the need for curriculum design with in-class real-world scenarios that prepare students for employment. Cooper (1990), Millis and Cottell (1998), and McIntyre, Thomas, and Jones (1999) underscored the perception of positive interdependence and individual accountability through cooperative team learning in the classroom such that students feel individually responsible for the success of all their classmates.

To further promote effective involvement, many have suggested supplementing intrinsic sources of motivation with extrinsic rewards by allocating part of grading for classroom and team participation. Slavin (1992) and Ravenscroft, Buckless, McCombs, and Zuckerman (1995) suggested that group grades must be assigned to promote shared responsibility to reinforce a more positive learning outcome. Fiechtner and Davis (1992), Maier and Keenan (1994), and Knabb (2000) suggested that in-class cooperative learning output should receive between 10 and 20% of the final grade.

Recently, a robust association between time spent on engaging activities and the quality of learning outcomes has been recognized. At the center is the proposition that when students spend time focusing and mastering new academic skills, the practice will "free up cognitive capacity, thus allowing for more cognitive engagement and achievement" (Linnenbrink & Pintrich, 2002, p. 321). Likewise, Fredricks et al. (2004) contended, "The potential for evolution in intensity makes engagement a desirable outcome. It is reasonable to assume that engagement, once established, builds on itself, thereby contributing to increased improvements in more distal outcomes of interest" (p. 61). Similarly, Bandura (1986) affirmed that engagement in activities, even with little initial knowledge, can significantly increase interest.

Finally, in a meta-analysis study of empirical work on students' cognitive motivation, Cameron et al. (2001) reached two important conclusions. First, time on task can be increased regardless of the initial orientation of the student as being extrinsically or intrinsically motivated. Second, if measured as time on task, rewards significantly increase students' intrinsic motivation and interest. Now, it is a common practice to use engagement time as the standard metric of success for classroom activities. Cognitive and behavioral psychologists often measure intrinsic motivations as length of time spent on a task. Akin-Little et al. (2004) stated, "How a person feels about an activity is reflected behaviorally as time spent on task" (p. 348). They argued that the difference between pre- and postintroduction of an external reinforcement is measured as an increment of engagement time on an activity, attributable to intrinsic motivation and the effectiveness of stimuli used.

What follows is the development of a bonus score reward model that aims to effectively promote students' participation incentives and time on task, and thus their interest.

REVIEW OF LABOR-SUPPLY THEORY AND OVERTIME PAY

Work-Leisure Theory of Labor Supply

In the work-leisure theory of labor supply, the individual worker chooses a combination of work hours and leisure time that maximizes his or her utility. The individual worker justifies that choice by evaluating the tradeoffs between a satisfactory amount of leisure time versus the level of income desired. The number of hours the individual is willing to work depends on the relative market value of the work and the individual's worth of leisure and real income at the margin (McConnell, Brue, & McPherson, 2009). Specifically, the optimal position for the worker is achieved once the marginal rate of substitution of income for leisure is equal to the available hourly wage rate.

As the work-leisure theory predicts, further adjustments in the number of work hours take place as either the wage rate or the worker's preferences for leisure and income change. These changes are manifest as substitution and income effects, which ultimately reshape incentives to work. In the case of a wage rate increase, as the opportunity costs of leisure rise, the individual worker substitutes more work hours for leisure. By contrast, the income effect is negative with respect to work. Seeing that prospects for future earnings are increased, the worker reduces work hours by purchasing more leisure.

The net effect depends on the relative magnitude of the substitution and income effects. This was best explained by Abel and Bernanke (2005). Barring a windfall profit or income, such as acquiring a considerable sum via lottery or inheritance, lower income workers' incentives to work increase as wages rise. According to Abel and Bernanke, hourly pay raises are generally considered short-run events in which workers take advantage of the opportunity to enhance earnings by supplying more work hours. However, the income effect is considered to be a long-run phenomenon in which incentives to work diminish as the worker accumulates wealth or expects a larger income.

Naturally, most full-time workers cannot unilaterally choose the number of hours they prefer to work. If the number of available job hours falls short of desired work hours, the laborer's marginal rate of substitution of leisure for income is less than the wage rate, and the worker may feel underemployed. A feeling of being overemployed sets in if the standard workday exceeds the hours the worker is

willing to work. In that case, the marginal rate of substitution of leisure for income is greater than the wage rate, and "the worker has the incentives to abridge effort" (McConnell et al., 2009, p. 36).

Implications of Work-Leisure Theory on Overtime and Premium Pay

Long periods of work and exertion may change worker incentives in several ways. First, because work is the source of disutility, extended hours change the work-leisure preferences in favor of leisure, thus diminishing incentives to work. Second, as earnings increase, demand for leisure increases in the short and long run. Finally, as workers age, they attach a smaller association between present efforts and future rewards, further lessening incentives to work (Bevars, 1969).

The Fair Labor Standards Act of 1938 distinguishes between pay for standard hours and overtime (Kaufman & Hotchkiss, 2006). The provisions of the Act mandate a premium pay rate of time and a half for work in excess of the standard 40 hr per week (McConnell et al., 2009). One of the accepted economic justifications for the Act is to augment employees' incentives to work by increasing the opportunity costs of leisure. The work-leisure theory suggests that increasing the average pay for standard hours increases the income effect more proportionately than the substitution effect. Consequently, the worker may be induced to choose more leisure over work. Conversely, if the worker is rewarded with a premium wage for hours beyond the standard workweek, the substitution effect is greater than the income effect; thus, greater satisfaction is drawn from additional work.

In a study conducted by the Bureau of Labor Statistics, Shank (1986) reported that although an estimated 8% of the labor force was willing to work less for proportionately lower wages, approximately one fourth was willing to work more hours for proportionately higher wages. Overall dominance of the substitution effect indicates that as expected payoffs grow, workers are willing to generate more effort.

If it is possible to persuade wage earners willingly work more hours by giving them overtime premium wages, is it possible to entice students to engage more in learning by granting them bonus scores? This research question is put to test in the remainder of the article. Specifically, in the next section, a participation model is developed founded on applying work-leisure theory to in-class learning. Subsequently, the model is tested empirically by measuring changes in learning behavior of extrinsically motivated students in pursuit of bonus scores.

APPLICATIONS OF WORK-LEISURE THEORY AND PREMIUM PAY TO IN-CLASS TEAM ENGAGEMENT

The participation model of an individual team member is presented in Figure 1. Participation time is divided between

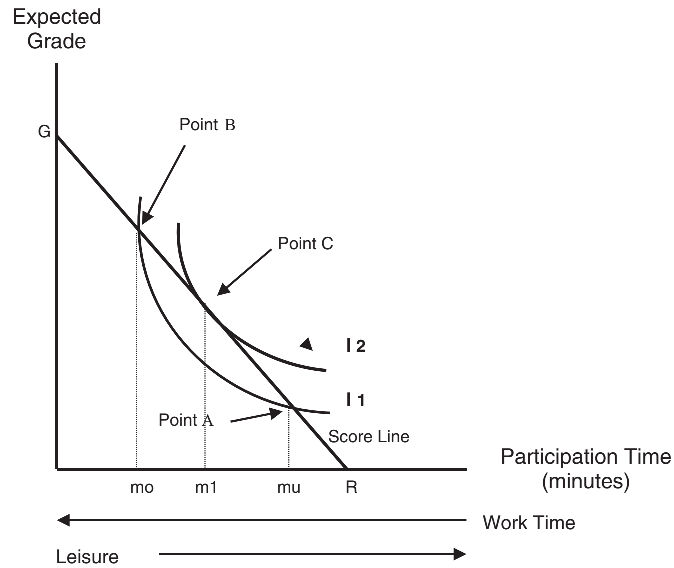

FIGURE 1 Optimal and nonoptimal positions between leisure and expected grades.

leisure and work, and is presented on the horizontal axis. The expected grade is on the vertical axis. The Score Line GR is an increasing function between participation time and the expected grade. It is drawn under the assumption that effort in team learning activities is rewarded proportionately by higher grades. Indifference curves represent the subjective tradeoff value of participation and expected grade. Maximum utility is achieved at Point C, where the indifference curve I2 is tangent to the score line GR. In that position, the student is devoting m1 minutes of participation time to earn a corresponding grade on the vertical axis.

If assuming that mu minutes of participation and effort are typically required to achieve a passing grade, then Point A represents a student who is eager to work more for a higher grade. At A, the marginal rate of substitution of leisure for expected grade is less than the slope of the score line. The student feels underworked. To such a student, a better grade is well worth additional effort. Such a position, with a relatively higher opportunity cost for leisure, fits the attitude of students who are active team members, who may lead the team's efforts, and invite the exchange of productive ideas and information. The students who fall into this category will advance their own position, as well as the team's, to Point C on a higher indifference curve.

If making the assumption that a passing grade requires longer participation time such as mo, then the results will be different. At Point B, the marginal rate of substitution of leisure for the expected grade is larger than the slope of the score line. The student will feel overworked, as the opportunity cost of a higher grade is too high. To these students, the reward of a higher grade does not fully compensate their efforts. This is typical of students who are quiet, or engage in conversations irrelevant to the task at hand, do not

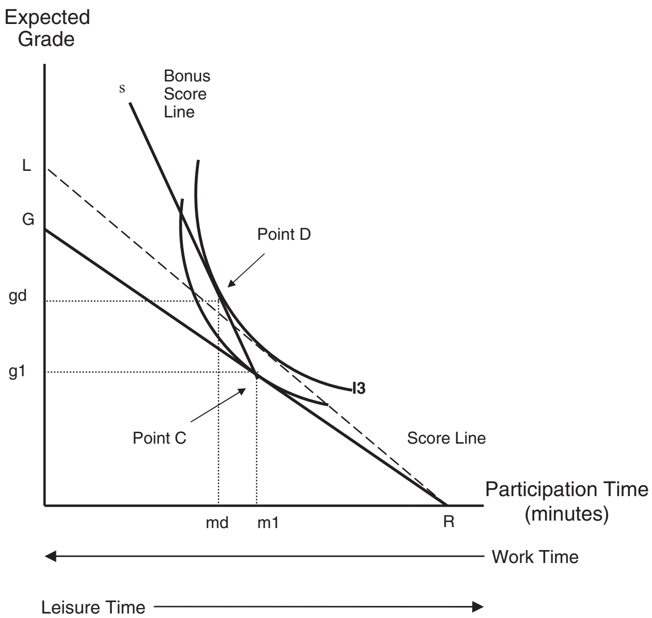

FIGURE 2 Bonus scores versus average score equivalent.

contribute to team efforts, and cannot wait for team activities to end. Typically, these students disengage and improve their position by choosing Point C. They tend to retard the advancement of team learning activities and the team as a whole.

From the preceding analysis, the solution is apparent. To increase the chances for learning success, motivation to participate must increase. This is accomplished by expanding rewards and the opportunity costs of leisure. However, as I explain, the reward augmentation must be incremental to be successful.

Figure 2 depicts the bonus adjustment participation model of an individual student. Point C presents the utility-maximized position of a student who is supplying m1 minutes of participation for the corresponding g1 expected grade. To increase student participation to the desired level of md minutes and the grade to gd, the opportunity cost of leisure must be raised. Here a reasonable proposition is that the student's cost of agreeing to participate is lowered simply by being offered more rewards in the form of an opportunity for scoring higher grades. This can be accomplished in two ways. The first method is an across-the-board increase in the score value of assignments, either by giving teams more tasks or assigning higher scores. The other method is by assigning incremental bonus rewards to additional tasks.

The choice is similar to the comparison of premium wages and straight-time equivalent pay for overtime work. Although both methods create income and substitution effects, premium wages are by far more effective in preserving work incentives. Increasing the average value of assignments is demonstrated in Figure 2 by rotating the score line from GR to LR to achieve the desired participation time md and desired grade gd. However, the slope of the indifference curves remains shallower than the slope of the score line. With a higher income or reward effect than a substitution effect, if confronted with LR, the student will want to move to the higher indifference curve I3 and supply less effort than the desired amount.

In contrast, an incremental bonus adjustment method has a larger substitution effect and generates higher grades, while simultaneously maintaining incentives to participate. As presented in Figure 2, up to m1 level of participation scores are awarded at a rate equal to the slope of the GR line. Beyond m1, participation is rewarded at a premium or bonus rate equal to the slope of the Bonus Score Line SC, which is more than GR. The difference is that larger rewards under the first method are applied to total hours of participation. The bonus method has a relatively smaller reward effect, as the bonus applies only to participation in excess of m1. The student will maximize utility by substituting work for leisure and moving to Point D on a higher indifference cure. At Point D, once again, the marginal rate of substitution of leisure for expected grade is equal to the grade rate, and the student will have the necessary incentives for the desired level of participation.

EXPERIMENT AND STATISTICAL RESULTS

The data for this study were collected from 10 introductory microeconomics classes over a period of five regular and two summer semesters. These classes were administered by two instructors who closely synchronized their in-class activities. Identical textbook, learning exercises, and teamwork material were used in all classes. Extra care was taken to assure that all activities were equivalent in terms of rigor. The results were that teaching methods, team learning techniques, and procedures for measuring and collecting data remained the same.

Given that microeconomics is a required course for college students from many academic disciplines, it seemed reasonable to presume that achieving a high or passing grade would be important to these students. A simple inquiry confirmed that assumption. At the beginning of each semester a few minutes were spent to educate students about the meaning of intrinsic and extrinsic motivation in learning. Then the students were asked first to anonymously identify themselves as intrinsically or extrinsically motivated for learning economics and then to classify the importance of their course grades on a 5-point Likert-type interval scaled question ranging from 1 (*grades are mostly unimportant to me*) to 5 (*grades are mostly important to me*). On average, 67.3% of the students reported that they were extrinsically oriented and interested in obtaining a high grade. The results also indicated that even among the majority of students who identified themselves as intrinsically motivated, receiving a high grade was still a strong desire.

TABLE 1
Bonus Adjustment Experiment: Average Team Participation Time and Average Scores

Chronological adjustments (mutually exclusive)	Number of teams	Number of team activities	Product of teams and activities	Participation (min)	Change in participation (relative to A)	Change in participation beyond expected	Significant change in *SD* of participation	Scores (out of 100)	Scores change (relative to A)	Significant change in *SD* of scores
A: Original activity (10 questions)	16	3	48	41	—	—	—	86	—	—
B: One question added	16	3	48	46	5	1	No	86	0	No
C: One bonus question added (10 points)	17	3	51	53	12[a]	8[a]	No	92	6[a]	No
D: One bonus question added (10 points) with condition[b]	15	3	45	64	23[a]	19[a]	Yes[a]	99	13[a]	Yes[a]

Note. All values are rounded.
[a]Significant change only relative to the original activity A but not to the preceding adjustment. [b]Condition: Must answer all questions for bonus question to count.

Students in these classes took three individual examinations during the semester. Prior to each examination, in-class problem-solving team activities were assigned to prepare the students for the tests. Four team activities, A through D, were conducted chronologically, one semester at a time. Table 1 contains the statistical results of the bonus adjustment experiment.

After the original activity A, adjustments were introduced, and changes in participation time and associated grades were recorded. With the class size limited to 40 students, and with team learning groups of four or five students per team, each class had between six and nine teams. With two classes involved in each experiment, 14–17 teams per activity were created. Multiplying those numbers by three activities per team, the sample size varied from 42 to 51 for each experiment.

The original activity A consisted of 10 questions from the end-of-chapter sections (either "Numerical Problems" or "Questions for Review and Thoughts"). The teams were given 75 min to discuss and produce a collaborative team response. They were allowed to leave early upon the completion of the work in 75-min classes or stop working and take a break (before the start of the second half of the class) in 165-min classes. On average, the teams took 41 min to complete the activity. The average score was 86%, as it appears in Table 1. It is important to note that this average score was reached in spite of the fact that the instructor was readily available to respond to any questions from the students, except those that might have compromised the final or deciding answer.

Adjustments B through D were designed to elevate the participation time and intensity of the team members in the learning process. The analysis of these results is particularly revealing with regard to the applicability of the labor-supply theory and premium pay for overtime.

RESULTS AND DISCUSSION

In experiment B, one question was added to A to increase the length of the team participation time. The participation time increased slightly, only 1 min beyond the expected average of approximately 4 min per question. It is interesting to note that the average score remained virtually unchanged at 86%, with no significant change in the standard deviation of either participation time or scores. This indicates that increasing the number of questions did not change the students' preferences with regard to participation and reward. Similar to increasing the standard pay in the labor market, the students' net effort decreased. Presented with an opportunity to participate more, they did not.

In experiment C, a further adjustment was made by keeping the same standard 10 questions as in experiment A, but this time adding one bonus question worth 10 points. The behavior of team learners changed considerably. With the bonus question providing an additional reward, similar to overtime pay, participation time and scores changed significantly relative to A. In this case, the opportunity cost of leisure increased to the point that the marginal substitution of leisure for grades became less than the slope of the score line, and the net effect was an increase in participation. Moreover, neither the standard deviation for participation time nor the standard deviation for scores changed significantly. This finding indicates that the team's response to adjustment C was uniformly the same.

Teams involved in experiment D were told that credit for the bonus question would be awarded only if reasonable answers were provided for all 10 standard questions. This condition was imposed to prevent students from replacing any of the standard questions with the bonus question. The outcome was significantly better than expected. Relative to the original activity A, average participation time increased by 23 min, and average scores improved by 13 min. Furthermore, the standard deviation for participation and scores also changed significantly. This demonstrates that at least some teams took a considerably longer time to participate to achieve higher grades and perhaps produce more suitable responses. The difference was significant, not only relative to the original activity A, but also to the prior activity C as well. This is consistent with the prediction of the work-leisure theory of labor supply. Apparently, the higher opportunity costs of leisure in D awakened the incentive to participate in more students relative to activity C.

POSSIBILITIES, LIMITATIONS, AND CONCLUSIONS

Behavioral and cognitive psychologists have sought for intrinsically motivated factors to elevate learners' interest for many years. In all likelihood, this was not a simple task when stringent conditions were added that learning activities must be volitional and autonomy-supportive. The advantage of a bonus score scheme stems from its simplicity. It can prolong time on task and the intensity of learning with minimal cost of design. It can obviate the need for complicated and distasteful incentive-generating commands such as, "You must do this because it is good for you," simply by rewarding engagement and increasing the opportunity cost to nonparticipants. Another advantage of a bonus system is that it can supplement any classroom activity to generate interest; thus, its use is only be limited by the imagination of the instructor.

The most challenging limitation for using a bonus reward scheme is the possibility that students score more than 100% on a given assignment. This problem can be moderated either by restricting the contribution of in-class activities to a total of 10% regardless of how much students score on any one activity, or by limiting the cumulative contribution of all in-class activities to a nominal predetermined amount in excess of 100%. For example, if on three in-class activities 10% bonus points are granted and assuming that students score perfect points of 110% on all three, the overall course grade is only inflated by a maximum of 3%.

However, this problem should not be assessed in isolation; rather, the costs of its inclusion must be appraised in proportion to its benefits. Students generally have a myopic view of the bonus score. Usually, their momentary desire to hedge against risk and acquire the bonus outweighs the assessment of the real impact of the additional scores on overall course grade, particularly at the beginning of the semester when they are less sure of the final outcome. Naturally, the greatest contribution of a bonus system may also be realized at the formative stages in the semester when engagement can embed intrinsic interest.

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